

Natural Disasters and Women Entrepreneurs During the Covid-19 Pandemic in Indonesia

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ABSTRACT

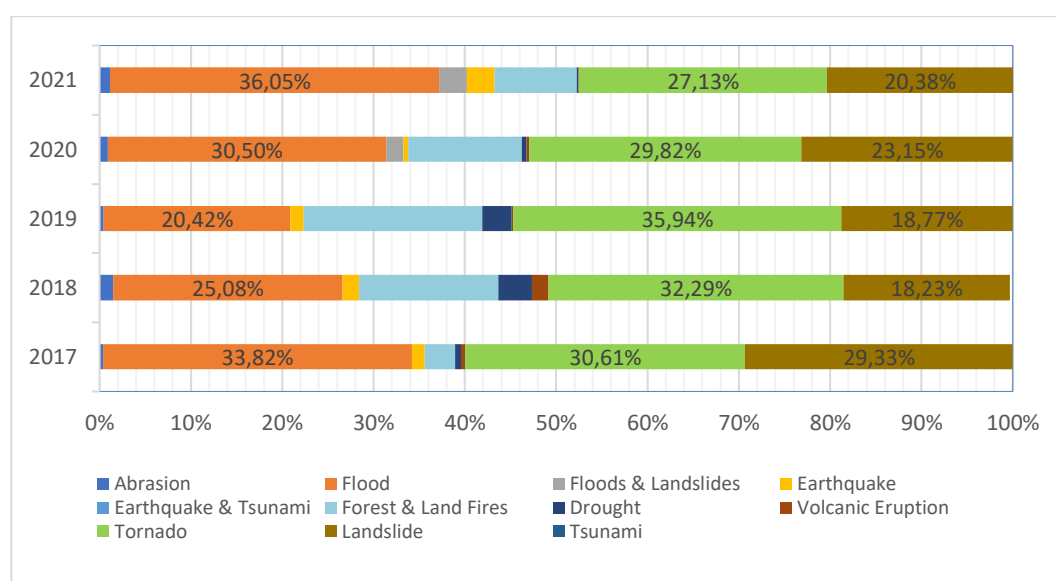
The Covid-19 Pandemic is affecting different social groups. One of them is a woman. To help save the family's economy, women try to increase their income through entrepreneurship. However, Indonesia was also surprised by the number of occurrences of natural disasters in various regions. This study aims to examine how the impact of natural disasters that occur with disaster risk on the participation of women entrepreneurs. Simultaneously, this is exacerbated by the Covid-19 Pandemic which has an impact on the state of women entrepreneurs. The method used is binary logistic regression followed by the Heckman model for income analysis. Using the Disaster Risk Index data from BNPB and the 2020 National Labor Force Survey (Sakernas) data, this study found that natural disasters encourage the participation of women entrepreneurs and cause income to decline due to natural disasters and the Covid-19 Pandemic. Moreover, internet use has helped women entrepreneurs increase their income in post-disaster conditions and the Covid-19 Pandemic in Indonesia.

Keywords: Covid-19 Pandemic, Income, Natural Disaster, Sakernas, Women Entrepreneurs

INTRODUCTION

The COVID-19 Pandemic is impacting many areas of human life. One of the most severe impacts of the Pandemic is the economic sector. This will affect the economy both in terms of supply and demand. The impact from the supply side is a decrease in the availability and productivity of labor, the existence of social distancing rules, and limited mobility. On the demand side, there is a decline in global demand and services and demand for domestic goods and services due to the decreased income experienced by many workers (Resosudarmo, Mulyaningsih, Priyarsono, Pratomo, & Yusuf, 2021). This can be a driving factor triggering the economic crisis. The Central Bureau of Statistics report (BPS, 2020) stated that the Indonesian economy in the first quarter of 2020 only grew by 2.97 percent, down far from 2019's growth of 5.02 percent. Although this figure is quite high compared to other countries in Southeast Asia (Ministry of Finance, 2021). This decline in economic output has affected the employment situation in Indonesia. The employment sector has at least two meanings, thus are the post-crisis increase in unemployment and changes in labor market conditions.

Figure 1. Types of Disaster Threats in Indonesia



Source: National Disaster Management Agency (BNPB, 2021)

In addition to the Covid-19 Pandemic, Indonesia was also hit by various natural disasters in various regions. Moreover, the fact shows that Indonesia is one of the countries with a high vulnerability to natural disasters. Based on World Risk Report data in the World Economic Forum (2020), Indonesia ranks 36th with a risk index of 10.36 out of 172 countries most prone to natural disasters. So that throughout 2021, BNPB recorded that there had been 3,093 natural disasters. Where wet hydrometeorological disasters, such as floods, extreme weather, and landslides, dominate natural disasters that hit almost all parts of Indonesia, reaching 36.05% in 2021, with the most dominant being floods (seen Figure 1). Although the number of disaster events in 2021 has decreased from the previous year, which was 4,649, the impact shows increasing results. So the discussion about natural disasters is very important considering the impact on the social sector and the economic sector, including increased unemployment, decreased production activity, and decreased assets.

In case of increased unemployment due to natural disasters, it will greatly affect the condition of the workforce. The female workforce is no exception. As the growth

potential for women to lose their jobs can impact the increasing number of informal workers. Women who worked in the informal sector before the pandemic conditions had reached 61% (Komnas Perempuan Indonesia, 2020). With the increasing number of women working in the informal sector, the possibility of formal employment will be more difficult due to the limited labor market. So one way that women can do this is to become entrepreneurs. With the dilemma of the challenges of domestic work, women can also help their family's economy through entrepreneurship (Sari, Pratomo, & Badriyah, 2022). If women do this, it indirectly brings income for themselves and their family, creates jobs, and ultimately contributes to the economy of the country (Sarri & Trihopoulou, 2005). Entrepreneurship for women becomes very important to help them survive in post-disaster conditions.

However, vulnerabilities are recognized as potential contributors to small business failure or a barrier to their small business recovery from disaster (Gutter & Saleem, 2006). These vulnerabilities can be caused by the socio-economic characteristics of small business actors and/or community-level characteristics related to where they do business and how they access resources. The Covid-19 Pandemic provides many policies, such as social distancing, Enforcement of Restrictions on Community Activities (PPKM), and limited access to mobility. This certainly becomes an obstacle in women's business, especially when combined with several disturbances, such as natural or non-natural disasters. The Covid-19 Pandemic and the high incidence of natural disasters create complexity. They can magnify impacts nonlinearly on small and medium-sized enterprises (SMEs), creating so-called complex events and including systemic risks, whose impacts are interdependent and cross-border as well as against conventional risks (Helgeson et al., 2020; Schweizer, 2021).

The further analysis discusses the welfare of the people affected by the disaster. Another study shows that the level of community welfare is lower in areas with high-intensity of natural disasters. After a disaster event, that will affect the level of community welfare. Thus, a survival strategy will emerge to bounce back from the disaster that occurred and adapt. Due to the occurrence of natural disasters and community welfare, various results have been found, such as some empirical evidence that the population positively impacts GRDP. When a natural disaster occurs, the influence of GRDP has a negative effect on losses due to natural disasters in the disaster area and other areas adjacent to the location of the disaster.

Based on the problems mentioned, this study aims to examine the impact of natural disasters on women entrepreneurs. Then the research continues to analyze how women's welfare after the Pandemic is taken from monthly income. From the previous explanation, the discussion between disaster and women entrepreneurs has become a topic that is not getting much attention from researchers. Because there is not much literature discussing this research, it is interesting to study. So this research needs to be done in order to close the gap in the literature on disasters.

LITERATURE REVIEW

Many previous studies have discussed the impact of natural disasters on the labor market. Among them, the research conducted by Helgeson et al. (2022) in his research mentions. Where generally, businesses that do not take proactive mitigation actions before an event or natural disaster occurs (for example, because they choose not to do so or for reasons they do not have the resources) may need to take reactive action to address the impact of natural hazards. The government, for example, a request for monetary assistance in this study, is what the United States officially provided through a loan from the Small Business Administration (SBA). Another study conducted by

Acevedo (2014) found that natural disasters, and floods, will increase unemployment, whose impact is more severe for women than men. Another finding from their research is that there is a reduction in the workforce's income, followed by a reduction in the labor supply.

From the study by Mueller and Quisumbing (2010), the impact of the Bangladesh Flood. They find short-term wage losses for agricultural workers and long-term losses for non-agricultural workers. In addition, based on the study, it was found that there was a sharper decline in short-term wages for people who were located further from the market. However, the distance to the market positively correlated with wages in the long run.

Another finding by Cox (2004) connects poverty due to natural disasters and associates overcoming it with entrepreneurship. These findings indicate that poverty is a social phenomenon that places several dimensions of poverty alleviation by empowering women entrepreneurs, one of which is Consequential Poverty. Where is poverty alleviation occurs due to other events or external factors outside the poor group, such as conflicts, natural disasters, environmental damage, and high population.

Furthermore, according to Dhar (2017), disaster closely relates to community welfare. The government has a role in providing funds for recovery due to natural disasters to restore the community's economic stability after natural disasters. This will encourage the private sector to invest again in disaster-affected areas so that the economy of the community affected by the disaster can return to what it was before the disaster occurred. Areas affected by the disaster are in dire need of investment funds from all sectors that can reinvest in order to improve the economy again to re-open job opportunities for people who have lost their jobs.

RESEARCH METHOD

This study is a quantitative study. The analysis used was binary logistic regression analysis. The first stage of this study was to examine the impact of natural disasters on the possibility of women becoming entrepreneurs during post-natural disaster conditions. Therefore, the equation used in the study was:

$$WE = \beta_0 + \beta_1 \text{ Natural Disaster} + \beta_2 \text{ Age} + \beta_3 \text{ Age}^2 + \beta_4 \text{ Education Level} + \beta_5 \text{ Urban} \\ + \beta_6 \text{ Experience} + \beta_7 \text{ Training} + \beta_8 \text{ Married} + \beta_9 \text{ Number of Household} + \beta_{10} \text{ Internet}$$

Where WE are a categorical variable that reflects women as an entrepreneur, natural disasters are the main independent variable in this study using a disaster risk index proxy. In addition, there is a set of control variables consisting of the following:

1. The personal characteristics of women entrepreneurs include age, age squared (it was done to capture the potential for non-linear relationships), marital status, area of residence (urban and rural areas) and the number of family members.
2. The level of education
3. Training is a binary variable to assess the participation of women in the pre-employment card program.
4. Experience is a binary variable to assess whether women have previous entrepreneurial experience.
5. The internet is a binary variable to assess whether women use it in their entrepreneurial activities.

The data used in this study are individual data sourced from the 2020 National Labor Force Survey (Sakernas) and 2021 Disaster Risk Index data sourced from the National Disaster Management Agency (BNPB, 2021).

This study then further examines the impact of natural disasters on the well-being of female entrepreneurs during the Pandemic, as reflected in wages received. In practice, individuals can dial into their preferred occupational status category depending on the level of income offered. We use the Heckman model based on logit regression. The second research purpose of this estimate is the hourly income log, while the explanatory variable is broadly the same as in the first equation. The main independent variable is the impact of natural disasters.

RESULTS

The results of the binary logistic regression analysis are shown in Table 1. To see the magnitude of the influence of the independent variable on the dependent variable obtained through the value of the odds ratio in percent. The focus of the results of this analysis is the impact of natural disasters on women's opportunities to become entrepreneurs. The second purpose of this study is to continue to see the impact on the income of women entrepreneurs. The results of the logit and Heckman models are shown in table 1 below.

Table 1. Logit Regression Estimation Results and Heckman Model

	Logit		Heckman Model	
	Mfx	P-value	Coef.	P-value
Natural Disaster	0.001	0.00	-0.005	0.00
Age	0.100	0.00	0.028	0.00
Age Squared	-0.001	0.00	-0.000	0.00
Education				
Diploma & University	-1.717	0.04	0.675	0.03
Senior High Academic & Vocational	-0.334	0.03	0.353	0.02
Urban	0.157	0.03	0.294	0.01
Experience	0.446	0.00	-0.126	0.00
Training (Kartu Prakerja)	0.475	0.00	-0.350	0.00
Married	0.214	0.00	-	-
Number of Families	-0.022	0.00	-	-
Internet	-0.112	0.00	0.245	0.00
Constant	-3.339	0.00	13.356	0.00
No. observation		47.566		47.566
Pseudo R square		0.25		0.26

DISCUSSION

Based on the results of binary logistic regression analysis, the participation of women entrepreneurs shows that if women are affected by natural disasters, their chances of becoming women entrepreneurs will be greater. Based on the magnitude of the odds ratio, it shows that women who are affected by natural disasters have a 0.1% greater chance than women who are affected by natural disasters. This is supported by David Cox (2014), who said that women affected by natural disasters would tend to develop, one of which is entrepreneurship in order to survive and achieve prosperity.

From the age aspect, it shows positive results. As women get older, the opportunity to participate in becoming an entrepreneur will be 10.5% greater. However, on the age variable or age variable squared, the results have a negative effect, which means that when the age of women increases, the longer it will have a negative effect or reduce the chances of their participation in becoming entrepreneurs. Similar results were also found in a study conducted by Priya and Bose (2020); women in the 20-30 year age group were more likely to start their business compared to women in the 30-40 year age group. Women aged 40-50 years and over 50 years are less supportive of starting their own businesses.

The education variable shows that women with higher education levels are less likely to participate in becoming female entrepreneurs. The results show that the percentage of female entrepreneurs with a college education is 82% less likely to participate and 28% less for women with high school/vocational education. This result is in line with Tambunan's (2009) research, which shows that when women are better educated and have better job opportunities, the increase in job opportunities for women and women's participation as entrepreneurs tends to decrease. However, different findings were found in a study conducted by Priya and Bose (2020), showing that the majority of female entrepreneurs have higher education at the undergraduate and postgraduate levels, compared to female entrepreneurs with high school education, who are smaller in number.

The variable of residence shows that women living in urban areas have a 17% greater chance of becoming entrepreneurs than women living in rural areas. This is related to job opportunities in urban areas, which generally are more than in rural areas, so urban women have more opportunities to work as wage workers or employees. Similar findings were also obtained from research conducted by Dhar (2017). This is the case in general, where the number of women entrepreneurs in rural areas is very low because rural women face more challenges and problems, such as a lack of funds/capital and low economic growth, that can hinder entrepreneurial activities (Gautam & Mishra, 2016).

The experience variable shows positive results, where women with entrepreneurial experience have a 56.2% greater chance than women who do not have entrepreneurial experience. Similar findings were found in research conducted by Priya and Bose (2020); Mack, Pierre, and Redican (2016), where female entrepreneurs with entrepreneurship experience of around 0-1 year tend to have the opportunity to participate in becoming entrepreneurs. This shows that women are interested in starting their online businesses with new technology. This allows for differences in cognitive frameworks between novices and experienced entrepreneurs, impacting their ability to spot opportunities and respond to technological change (Mack et al., 2016).

Furthermore, the training variable in this study is pre-employment card training. This is because certified training provides workforce skills, which affects their competence. Especially for entrepreneurs who are just starting their businesses, the existence of this skill will contribute to their entrepreneurial abilities. This is in line with the research conducted by Manisha and Tripti (2015), where the need for training programs for start-ups or new businesses because most women entrepreneurs face problems because they do not know the process of starting a business.

Furthermore, the marital status variable shows that if women with married status participate in becoming entrepreneurs, the chances are 23.8% greater than women with unmarried status. This is related to household income needs. So women choose to participate in becoming entrepreneurs to get additional income to meet the needs of

their families. These results are supported by research conducted by Ekpe (2011), which shows the results that married women tend to be entrepreneurs. However, different findings were found in a study conducted by (Priya & Bose, 2020), in which the study found that women were more likely to start their online business before getting married.

Different things happened to the variable number of family members, where the results showed that women with a large number of family members had 19.7% less chance of becoming entrepreneurs. Although the figure is very small, this may be related to women's domestic duties when the more the number of family members, the more work and domestic tasks at home.

The results confirm that online businesses have great potential to empower women by helping them become entrepreneurs. Additionally, the internet and social media see entrepreneurship as a solution to the dilemma women face in coping with and balancing work and family life (Manisha & Tripti, 2015). In addition, due to the Covid-19 Pandemic has also had an impact on women's entrepreneurial activities. The existence of the internet makes it easier for women entrepreneurs to continue to run their businesses even during the covid-19 Pandemic.

Based on the odds ratio, the internet variable's magnitude shows that female internet users are 10.5% less likely to become entrepreneurs post-disaster compared to women who do not use the internet. This is thought to be because women cannot pay the post-disaster internet fees to run their businesses. Therefore, there is a great need for financial assistance from the government. Different findings were found in the research of Halford (2005); Still and Walker (2006); Mason, Carter, and Tagg (2008), and Dettling (2017) found that the availability and use of the internet is one of the factors for the increasing number of women who are entrepreneurs. So if the internet is available for women after the disaster, this is expected to help facilitate their business activities.

Discussion of Income Estimation Results with the Heckman Model

The estimation results of the Heckman model show a significant negative result, where the impact of natural disasters on women entrepreneurs will reduce their business income by 0.5%. This follows a study conducted by Helgeson (2022), which states that natural disasters negatively impact women entrepreneurs, especially entrepreneurs new to the business world. And the Covid-19 Pandemic is getting worse for their business.

In the age variable, the results show that the increasing age will increase the income of women entrepreneurs by 2.8% in the Heckman model. This result is similar to a study by Sumantri, Fariyanti, and Winandi (2013), which showed that the older a woman entrepreneur gets, their income improves over time. This is because consumers who are loyal or who have long been consumers who have purchased the products of women entrepreneurs are increasing over time and increasing the age of women entrepreneurs, thereby increasing their income. However, this study also examines advanced age with the variable age 2, where the results are significantly negative for both models. This means that even though the income of women entrepreneurs will increase, in old age, it tends to decrease income. This may occur due to increasing age and physically no longer productive.

The Education variable shows that women who take higher education in this study are college and SMA/SMK tend to increase their income by 67.5% and 35.3%, respectively, in the Heckman model. This is supported by Huarng's, Mas-Tur, and Yu (2012) research, where female entrepreneurs with higher education tend to have higher

incomes. This is because educated women tend to learn and gain greater and better knowledge about how to make a profit in their businesses.

The city variable using the Heckman model shows that living in the city has a 29.4% greater chance of increasing the income of women entrepreneurs. This is due to the technological and environmental gap between rural and urban areas. Fast-growing technological and environmental developments in urban areas generally encourage entrepreneurs living in urban areas to make higher profits (Gustiana, Utami, & Wicaksono, 2020).

Furthermore, for the experience variable, the Heckman model shows a significant negative result of 12.6% each. Where this shows that the experience variable tends to reduce the income of women entrepreneurs, this may be a bit different from what usually happens in everyday life. This may happen when women entrepreneurs want to achieve the target of increasing sales volume and a wide marketing area. Still, product prices are lowered to achieve this, and consequently, their income is reduced. Similar results were found in research (Sumantri et al., 2013), which states that women entrepreneurs assume that earning high incomes does not require business experience because business experience is needed precisely when the ability to sell products so that their products increase with increasing sales volume and marketing area.

The training variable also shows significant negative results on the model. This means that training tends to reduce the income of women entrepreneurs. This is estimated to be related to the costs incurred when participating in the training. So that it will directly or indirectly impact the income of women entrepreneurs. However, different results were found in research (Sumantri et al., 2013), which states that female entrepreneurs need adequate training to get better income from time to time.

The estimation results of the Heckman model show significant positive results, where the use of the internet by women entrepreneurs has the opportunity to increase their income by 24.5%. This follows a study conducted by Gustiana et al. (2020), entrepreneurs who use the internet will also earn higher profits than those who do not. Research with similar results is shown by Fatimah (2015) that the internet, social media, and information technology reduce the business costs of women entrepreneurs. So that the income of women entrepreneurs increases.

CONCLUSION

This study shows that women who are affected by natural disasters have a greater chance of becoming women entrepreneurs compared to women who are not affected by disasters. Although the percentage is small, this is due to the encouragement of women to increase their family income in post-disaster conditions. The age variable shows positive and negative results where the increasing age the opportunity to become a female entrepreneur is higher, but with increasing age the older it will also reduce productivity, thereby reducing the opportunity for women to become entrepreneurs. Variables of experience, training (Kartu Pra-kerja), and marital status have the opportunity to increase the participation of women entrepreneurs. The education variable has a negative effect because women with higher education tend to choose paid jobs, and the variable number of household members is negative because women tend to do domestic tasks along with the number of children or the number of household members.

The study continues to see how the impact of natural disasters on the welfare of women entrepreneurs in terms of income during the Pandemic. The impact of natural disasters has the opportunity to reduce the income of women entrepreneurs. Women

entrepreneurs in urban areas tend to have higher incomes due to more advanced economic growth than in rural areas. The age variable showed similar results in the first study objective. The results of education have a positive effect on increasing the income of women entrepreneurs. At the same time, experience and training tend to reduce the income of women entrepreneurs. With these results, there is a need to provide financial support from governments to support women entrepreneurs affected by natural disasters. This research provides suggestions for future research regarding whether women entrepreneurs are easier to recover from disasters in terms of employment and income.

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DECLARATION OF CONFLICTING INTERESTS

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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